

**WHAT IS CLAIMED IS:**

1. A method for the preparation of a storage-stable fatty acid calcium salt product comprising:

5 forming a reactive admixture comprising (a) an unsaturated fatty acid glyceride feedstock; and (b) from about 10% to about 30% of the total admixture weight of calcium hydroxide; and

10 heating the admixture to a temperature at which said fatty acid glycerides saponify to form fatty acid calcium salts in an atmosphere in which the partial pressure of oxygen has been reduced by an amount effective to provide an improvement in storage stability.

2. The method of claim 1, wherein said partial pressure of oxygen is reduced by inert gas blanketing of said admixture while heating.

15 3. The method of claim 2, wherein said inert gas comprises nitrogen.

4. The method of claim 1, wherein said partial pressure of oxygen is reduced by heating said admixture under vacuum.

20 5. The method of claim 1, wherein said unsaturated fatty acid glyceride feedstock comprises an unsaturated fatty acid concentration sufficient to form unstable calcium salt products when saponified in an ambient atmosphere

25 6. The method of claim 1, wherein said unsaturated fatty acid glyceride feedstock comprises polyunsaturated fatty acids.

7. The method of claim 6, wherein said polyunsaturated fatty acids are selected from the group consisting of omega-3 and omega-6 fatty acids and combinations of either or both.

5 8. The method of claim 7, wherein said polyunsaturated fatty acids comprise one or more omega-3 fatty acids selected from the group consisting of DHA, EPA, DPA and LNA.

10 9. The method of claim 6, wherein said polyunsaturated fatty acids comprise one or more conjugated fatty acids.

10 10. The method of claim 9, wherein said one or more conjugated fatty acids comprise one or more CLA isomers.

15 11. The method of claim 1, wherein said fatty acid glyceride feedstock comprises a mixture of two or more C<sub>10</sub>-C<sub>22</sub> fatty acids having greater than about 45 % by weight of the fatty acid content in the form of fatty acid glycerides.

20 12. The method of claim 11, wherein about 85 and about 100 % by weight of said fatty acid mixture is in the form of fatty acid glycerides.

13. The method of claim 1, wherein said fatty acid glyceride feedstock comprises from about 40 to about 95 % by weight of unsaturated fatty acids.

25 14. The method of claim 1, wherein said feedstock comprises up to about 100 % by weight of fish oil.

15. The method of claim 14, wherein said fish oil is selected from the group consisting of menhaden, herring, mackerel, caplin, tilapia, tuna, sardine, pacific saury and krill oils.

5 16. The method of claim 15, wherein said fish oil comprises one or more omega-3 or omega-6 fatty acids selected from the group consisting of DHA, EPA, DPA, LNA, linoleic acid and arachidonic acid.

10 17. The method of claim 1, further comprising the step of cooling said admixture and forming a solid, free-flowing and granular fatty acid calcium salt product.

15 18. The method of claim 17, wherein said admixture is cooled in said atmosphere in which said partial pressure of oxygen has been reduced by an amount effective to provide an improvement in storage stability

19. A fatty acid calcium salt prepared by the method of claim 1, wherein said calcium salt comprises one or more beneficial unsaturated fatty acids.

20 20. A fatty acid calcium salt according to claim 19, comprising polyunsaturated fatty acids.

25 21. The fatty acid calcium salt of claim 20, wherein said polyunsaturated fatty acids are selected from the group consisting of omega-3 and omega-6 fatty acids and combinations of either or both.

22. The fatty acid calcium salt of claim 21, wherein said polyunsaturated fatty acids comprise one or more omega-3 or omega-6 fatty acids selected from the group consisting of DHA, EPA, DPA, LNA, linoleic acid and arachidonic acid..

23. The fatty acid calcium salt of claim 22, comprising at least one polyunsaturated fatty acid selected from the group consisting of about 1 to about 25% by weight DHA, about 1 to about 25% by weight EPA, about 1 to about 25% by weight DPA, about 1 to about 75% by weight LNA, about 0.5 to about 10 % by weight arachidonic acid, 5 about 1 to about 80% by weight linoleic acid and about 1 to about 80% by weight CLA.

24. The fatty acid calcium salt of claim 20, wherein said polyunsaturated fatty acids comprise one or more conjugated fatty acids.

10 25. The fatty acid calcium salt of claim 24, wherein said one or more conjugated fatty acids comprise one or more CLA isomers.

26. A fatty acid calcium salt prepared by the method of claim 12.

15 27. A fatty acid calcium salt prepared by the method of claim 13.

28. A fatty acid calcium salt prepared by the method of claim 14.

29. The fatty acid calcium salt of claim 28, wherein said fish oil is selected from 20 the group consisting of menhaden, herring, mackerel, caplin, tilapia, tuna, sardine, pacific saury and krill oils.

30. The fatty acid calcium salt of claim 29, wherein said fish oil comprises one or more omega-3 or omega-6 fatty acids selected from the group consisting of DHA, EPA, DPA, 25 LNA, linoleic acid and arachidonic acid.

31. A rumen bypass feed supplement comprising the fatty acid calcium salt of claim 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29 or 30. 12

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32. A storage-stable calcium salt saponification product of an unsaturated oil consisting essentially of one or more fish oils. ✓

5 33. The saponification product of claim 32, wherein said one or more fish oils are selected from the group consisting of menhaden, herring, mackerel, caplin, tilapia, tuna, sardine, pacific saury and krill oils.

10 34. The saponification product of claim 32, wherein said one or more fish oils comprise one or more fatty acids selected from the group consisting of omega-3 and omega-6 fatty acids.

15 35. The saponification product of claim 34, wherein said one or more fish oils comprise one or more omega-3 or omega-6 fatty acids selected from the group consisting of DHA, EPA, DPA, LNA, linoleic acid and arachidonic acid.

20 36. The saponification product of claim 35, comprising at least one polyunsaturated fatty acid selected from the group consisting of about 1 to about 25% by weight DHA, about 1 to about 25% by weight EPA, about 1 to about 25% by weight DPA, about 1 to about 75% by weight LNA, about 0.5 to about 10 % by weight arachidonic acid, about 1 to about 80% by weight linoleic acid and about 1 to about 80% by weight CLA.

37. A rumen bypass feed supplement comprising the saponification product of claim 32.

25 38. A storage-stable fatty acid calcium salt saponification product of a fatty acid glyceride feedstock having an unsaturated fatty acid concentration sufficient to form unstable calcium salt products when saponified in an ambient atmosphere. 3

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39. The fatty acid calcium salt of claim 38, wherein said unsaturated fatty acid glyceride feedstock comprises polyunsaturated fatty acids.

40. The fatty acid calcium salt of claim 39, wherein said polyunsaturated fatty acids are selected from the group consisting of omega-3 and omega-6 fatty acids and combinations of either or both.

41. The fatty acid calcium salt of claim 40, wherein said polyunsaturated fatty acids comprise one or more omega-3 or omega-6 fatty acids selected from the group consisting of DHA, EPA, DPA, LNA, linoleic acid and arachidonic acid.

42. The fatty acid calcium salt of claim 41, comprising at least one polyunsaturated fatty acid selected from the group consisting of about 1 to about 25% by weight DHA, about 1 to about 25% by weight EPA, about 1 to about 25% by weight DPA, about 1 to about 75% by weight LNA, about 0.5 to about 10 % by weight arachidonic acid, about 1 to about 80% by weight linoleic acid and about 1 to about 80% by weight CLA.

43. The fatty acid calcium salt of claim 39, wherein said polyunsaturated fatty acids comprise one or more conjugated fatty acids.

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44. The fatty acid calcium salt of claim 43, wherein said one or more conjugated fatty acids comprise one or more CLA isomers.

45. The fatty acid calcium salt of claim 38, wherein said fatty acid glyceride feedstock comprises from about 50 to about 85 % by weight of unsaturated fatty acids.

46. A rumen bypass feed supplement comprising the fatty acid calcium salt of claim 38, 39, 40, 41, 42, 43 or 44.